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ABSTRACT

This cross curriculum guide links mathematics, language arts, and social studies. The guide is divided into two sections. The first section provides a series of language arts activities and the second social studies activities. Within these two curriculum areas, the activities provided are based on three Square One TV formats: (1) Mathnet, the detective serial that wraps up each episode of the program; (2) the game shows, which integrate mathematics into popular game show formats; and (3) the commercials, which parody television advertisements. Each two-page spread provides two short activities to spark interest and discussion, and a step-by-step activity with a reproducible student page. Follow-up activities are also included. Topics include time, estimation, weights, graphing, and the metric system. The curriculum goals of this program are also included. (KR)

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CURRICULUM CONNECTIONS

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GUIDE

SQUARE ONE TV CURRICULUM CONNECTIONS TEACHER'S GUIDE

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TEACHER'S GUIDE
CURRICULUM
CONNECTIONS

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INTRODUCTION

SQUARE ONE TV is a unique television series about mathematics, produced by the Children's Television Workshop (CTW), the creators of **SESAME STREET, THE ELECTRIC COMPANY,** and **3-2-1 CONTACT.** The first thing you should know about **SQUARE ONE TV** is that **WE WANT YOU TO VIDEOTAPE IT OFF THE AIR, AND USE IT IN THE CLASSROOM.** It's perfectly legal, as long as you erase the tapes within three years. **SQUARE ONE TV** airs Monday through Friday on most member stations of the Public Broadcasting Service (PBS). It's aimed at the nation's 14 million eight- to twelve-year-olds. Each half hour show includes several segments, many of which parody familiar television formats, such as game shows, sitcoms, cartoons, music videos, and commercials. **SQUARE ONE TV's** educational goals may be found in the back of this guide.

USING SQUARE ONE TV IN THE CLASSROOM

Although SQUARE ONE TV was primarily designed for home viewing, you can also use the series successfully in your classroom. The key to in-class use of the series is selecting material that best matches your curricular goals. Most often, this involves the use of segments rather than entire 30-minute programs. The following suggestions are intended to help you make the most of SQUARE ONE TV in your class:

1. Try to tape as many of the SQUARE ONE TV programs off the air as you can. This will give you the broadest possible selection of segments from which to choose. Each show is identified by a reference number that appears briefly before each program.
2. Be sure you preview the segments and review the printed materials before using the segments in class. You may also want to encourage students to watch a whole show at home, so they'll be familiar with its spirit.
3. When using one of the segments, we suggest you:
   - Review the segment, prior to in-class use.
   - Prepare a few questions to help focus students' attention prior to viewing.
   - Show an entire segment once or twice to familiarize students with it.
   - Follow-up watching by using the related activities and extensions provided.

ABOUT THIS TEACHER'S GUIDE

We have created this special *Curriculum Connections Teacher's Guide* to acquaint you with the possibilities for using SQUARE ONE TV to enhance your language arts and social studies teaching. As you challenge your students to make curriculum connections, they learn to see the relationships that exist between disciplines in the world around them.

This teacher's guide is divided into two sections. The first section provides a series of language arts activities. The second section focuses on social studies activities. Within these two curriculum areas, the activities provided are based on three SQUARE ONE TV formats: Mathnet, the detective serial that wraps up each episode of SQUARE ONE TV; the Game Shows, which integrate mathematics into popular game show formats; and the Commercials, which parody tv advertisements.

Each two-page spread provides two short activities to spark interest and discussion, and a step-by-step activity with a reproducible student page that can be the focus of a class-length activity. Follow-up activities—which provide opportunities to enrich or extend ideas—are included for these three SQUARE ONE TV formats.

To provide a model for integrating Mathnet into the classroom, we have selected two week-long Mathnet mysteries and featured one activity for each day's episode. The language arts section focuses on the Mathnet mystery "The Trial of George Frankly" and the social studies section is based on "The Case of the Deceptive Data."

The guide concludes with math bonus activities, based on SQUARE ONE TV commercials. It also contains a teacher's reference section, with helpful information.

Curriculum Connections is designed to meet the needs of students with different learning styles. Both individual and cooperative learning activities have been provided. The cooperative learning activities work best if students are placed in mixed ability groups.

The Trial of George Frankly

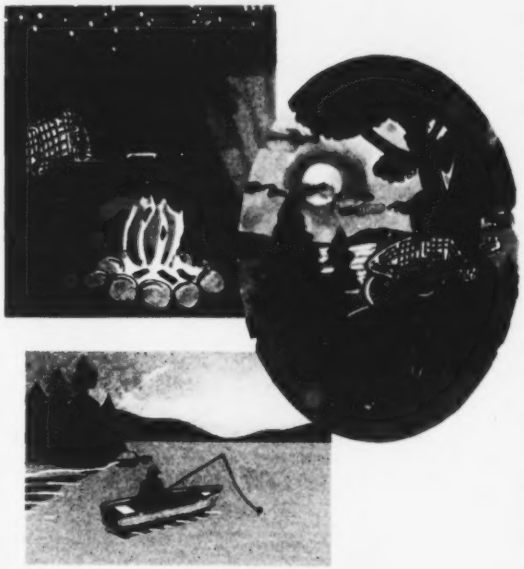
inside story

Things look bad for George Frankly when a videotape shows him robbing a bank. He can't prove that he was off camping on Nomanissan Island at the time the crime was committed—and lots of witnesses identify him as the robber. Even the lone defense witness, a pilot, says he flew George off the island in time to commit the crime. Kate checks weather reports to prove the plane couldn't have taken off when the pilot claims. She presents a convincing case to get George off the hook when suddenly he confesses. Everyone is shocked—until the real George Frankly bursts into the courtroom. He unmasks his impersonator and ruins the frame-up constructed by the Karamazov brothers—ex-cons who had been sent up the river by George. (See page 24 for show numbers featuring "The Trial of George Frankly.")

Writing a Descriptive Paragraph

MONDAY

George tells his boss that he visited "a little bitty island in a great big lake" in the Great North Woods—not much of a description for a one-week, fun-filled vacation. Ask students to help George fill out his picture of Nomanissan Island by writing a paragraph describing his vacation site. To help students imagine what Nomanissan Island might have been like, ask them to think about what George might have seen, heard, felt, smelled, or tasted.



FOLLOW-UP

Directions depend on time and sequence words. Using these words, ask students to write directions that lead from the classroom to someplace in the school—but to leave out the last step. Students can switch papers and try to figure out exactly where the directions lead.

STEP BY STEP ACTIVITY

Using Time Sequence

TUESDAY

With so much evidence stacked against him, it looks like George's future vacations may be spent behind bars—unless Kate can help him. George must tell Kate exactly what he did—clearly and in the correct time order sequence. In this activity, students practice telling a story in time order sequence.

WHAT YOU NEED:
copies of the activity page

WHAT TO DO:

STEP 1: Distribute one copy of the activity page, "It's about Time," to each student.

STEP 2: Have students read the time and sequence words in the clock on the activity page and use these words to describe an activity they did yesterday—like getting ready for school, or eating lunch.

STEP 3: Using the activity page, ask students to write a paragraph that incorporates as many of the time words as possible and describes what happened to George in Monday and Tuesday's episodes of the story.

STEP 4: Have students discover the importance of time and sequence words by rewriting their paragraphs and mixing up the order of the sentences. Ask students to exchange paragraphs with a partner, and put their partner's sentences back in the correct order.

TO TUNE IN TO WEDNESDAY'S SHOW, TURN TO PAGE 6...

name:

date:

It's about time!

The Trial of George Frankly...continued

The Mystery Genre

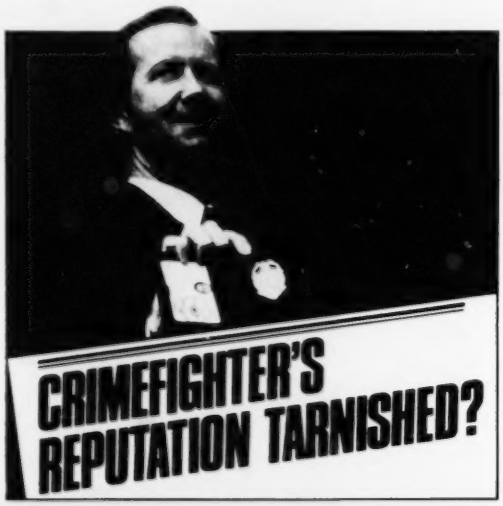
WEDNESDAY

As Mathnetters unravel the mystery of George Frankly, alleged bank robber, students can further explore the mystery genre by reading favorite whodunits. Among children's favorites are Seymour Simon's *Einstein Anderson* books, Sid Fleischman's *Bloodhound Gang* stories, and E. A. Haas's *Incognito Mosquito* books. Students can hold a super sleuth book review hour, sharing information on exciting plot twists and surprising strategies that super sleuths used to unravel their mysteries. What do these mysteries have in common with Mathnet? How are they different? Once they've discussed their stories, students can write their own book reviews. Keep the reviews on file for student reference.

Newspaper Headlines and Stories

THURSDAY

Have the charges against George tarnished his image as a crimestopper? The newspapers in Tinseltown certainly think so. His trial is front page news. Have students write a series of headlines about George and his troubles. Topics can include the bank robbery, George as suspect, the evidence against George, the first day of the trial, and the outcome of the trial. Students can pick their own favorite headlines and write news stories describing the who, what, when, why, and where of the day's events.



FOLLOW-UP

Students can make up a second set of thought balloons for the end of the trial when George enters the courtroom and reveals the truth about the Karamazov brothers. Or students can rewrite the trial's ending. Suppose the Karamazov brothers got away with their scheme? What would happen to George? What would happen to the sneaky Karamazov brothers?

STEP BY STEP ACTIVITY

Point of View

FRIDAY

As the trial nears its climax, George jumps to his feet and confesses his guilt. For a moment, the courtroom is silent—but no doubt everyone is thinking about George's shocking confession. Students can take a look at this scene from the perspective of other participants in the courtroom drama with the following activity.

WHAT YOU NEED:
copies of the activity page

WHAT TO DO:

STEP 1: Give each student one copy of the activity page, "The Confession."

STEP 2: The scene—the courtroom, just after George's confession. The question—what's on everyone's mind? Have students fill in each thought balloon to indicate what each character is thinking when George confesses. Before students begin writing, make sure they know the identity of each character shown on the activity page. Encourage students to think about how each person might feel about George's confession.

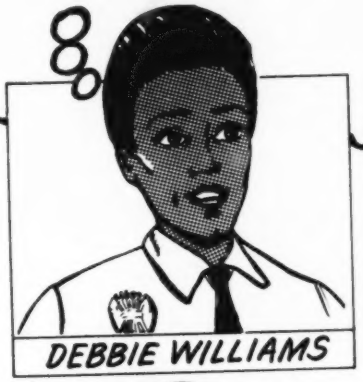
STEP 3: After students complete their activity pages, they can use one of their thought balloons as a take-off point for a story about George's case written from the point of view of that character.

THE CONFESSION

name:

date:

I CONFESS!



DEBBIE WILLIAMS

KATE MONDAY

THE JUDGE

What's on everyone's mind in the courtroom when George makes his startling confession?

GEORGE'S BOSS

LANGUAGE ARTS CONNECTIONS

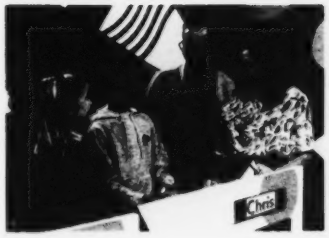
GAME SHOWS!

CLOSE CALL

How can you tell how many people have attended a book fair? Sometimes, it's impossible to provide an exact number. That's where estimation comes in. SQUARE ONE TV's game show of estimation, "Close Call," provides entertaining practice with this critical skill. The activities presented here provide writing opportunities based on this game. (See page 24 for "Close Call" game rules and show numbers.)

Writing a Letter

Have your students ever written a letter describing a play, movie, or sporting event that they saw? In this activity, students write a letter to a friend describing an episode of SQUARE ONE TV's "Close Call." View an episode with your class and ask students to take notes on how the game is played, the specific mathematical problems presented, and other details —such as funny things the host might say or do. Students may need to view the episode more than once. When students' notetaking is completed, they can use the information to write a letter to a friend. Students should include their thoughts about why a contestant's estimate was accurate or not.



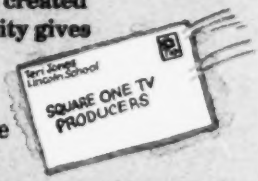
Writing an Explanation

Watch an episode of "Close Call" with the class. Ask students to pay special attention to the estimates made by contestants. Before the final estimate is made, stop the tape and ask students to write their own estimates, along with an explanation of their reasoning. Invite students to share their strategies with the class. Discuss the different approaches students used to arrive at their estimates. Then finish viewing the estimation problem to discover how close students' answers were to the actual answer. Repeat this exercise for as many estimation problems as you like.

STEP BY STEP ACTIVITY

Using Persuasive Writing

Can your students persuade SQUARE ONE TV producers to use estimation problems created in your class? This activity gives them a chance to try.



WHAT YOU NEED:
copies of the activity page

WHAT TO DO:

STEP 1: Together with your class, view an episode of "Close Call," paying particular attention to the kinds of problems presented to the contestants.

STEP 2: Distribute one copy of the activity page, "Dear Producer," to each student.

STEP 3: Set the stage—your students are aspiring writers for "Close Call." Students will need to think of an estimation problem based on the drawing on the activity page. Problems might focus on estimating the number of windows, the height of the tallest building, or the distance from one building to another.

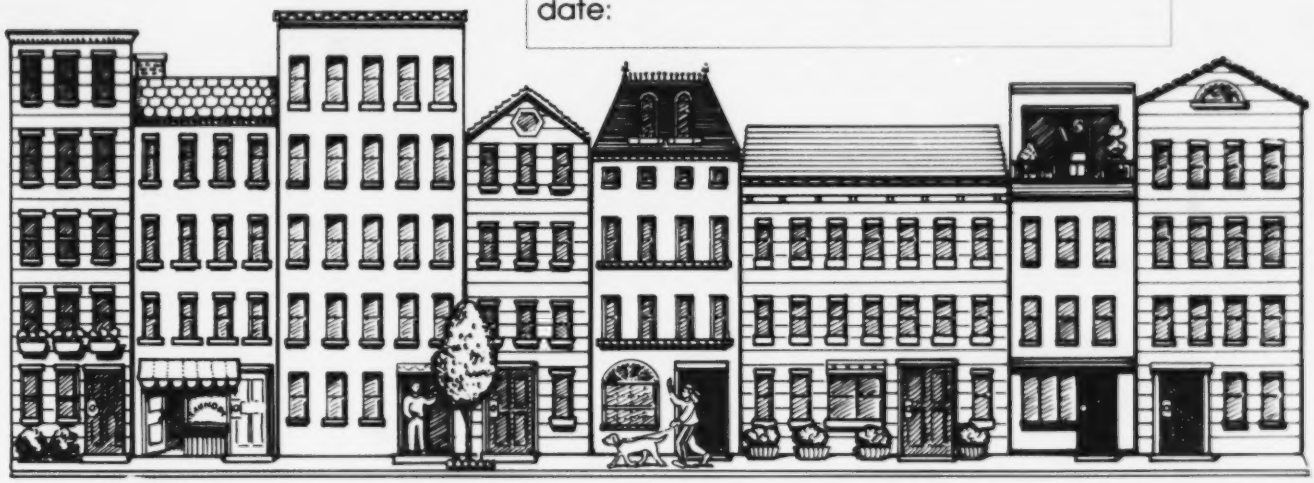
STEP 4: Once students complete their estimation tasks, they can write a persuasive letter, describing their estimation problem in clear and simple terms to SQUARE ONE TV producers. To make sure that their ideas are clear, students can share their letters with a partner. Students can send their letters to: Children's Television Workshop, School Services, Box CCG, 1 Lincoln Plaza, New York, N.Y. 10023.

FOLLOW-UP

Have students present their estimation questions to the class. Classmates can try to tackle each other's estimation problems.

name:

date:



Dear Producer,

LANGUAGE ARTS CONNECTIONS

Commercials

Commercials are designed to sell different products, using a variety of techniques. In these activities students create their own SQUARE ONE TV commercials. (See page 24 for show numbers featuring SQUARE ONE TV commercials.)

Writing a Testimonial Commercial

take one

When a famous person endorses a product in a commercial, it's called a celebrity testimonial. Have students find examples of testimonial advertising on television and report their findings to the class. View sections of SQUARE ONE TV that feature celebrities such as James Earl Jones and Bobby McFerrin. (See page 24 for show numbers featuring celebrities.) Divide students into groups. Ask groups to choose a celebrity and write a commercial in which that celebrity explains why math is important to her or him. For example,

Bobby McFerrin might say, "Fractions help my singing. They tell me how much time to spend on each note, and that gives me rhythm." Have students consider practical applications of math that the celebrities might use in their professions such as graphs, charts, scale, or percentages.

Writing a "Slice-of-Life" Commercial

take two

Testimonials can make products seem exciting because people may admire the celebrities—but it's also nice to know the product is useful to people who aren't celebrities. That's why commercials sometimes use a technique called a "slice-of-life"—snap shots of everyday people using products themselves.

To get students started on their own "slice-of-life" commercials, have them interview classmates about how they use mathematics outside the classroom. Questions might include, "Do you get an allowance? How do you use it?" "Do you keep score playing games?" "Do you ever watch SQUARE ONE TV at home?" When students have completed their interviews, ask them to write a commercial using the interviews in their commercials.

FOLLOW-UP

Storyboards can be expanded by writing dialogue. Once students complete their commercials, they can be produced using classmates as performers. Make your own props for the commercials.

STEP BY STEP ACTIVITY

Creating a Storyboard

Similar products of equal weight are not always the same price. For example, one 16-ounce brand of dishwashing liquid may be more expensive than another 16-ounce brand. In this activity, students write storyboards for commercials featuring the promotion of one item over another.

WHAT YOU NEED:
copies of the activity page, markers

WHAT TO DO:

STEP 1: Ask students to go shopping with an adult and compare prices of similar products of equal weight—for example soaps, canned foods, or detergents. Students should select one kind of product and list the weights and prices of various brands.

STEP 2: Give each student two copies of the activity page, "Picture This Product." Explain that they will make a storyboard for a commercial about a product they chose.

STEP 3: Ask students to analyze how they might promote their product over others. For example, they may try to sell it based on lower price, or—if it is more expensive than other products—on the claim of superior quality.

STEP 4: Students should use one copy of the activity page to plan their commercials. Provide students with the following restrictions: A. The client wants the product shown 75% of the time. B. The producer wants his son in 50% of the commercial. C. The client wants the competitive product shown only 25% of the time.

STEP 5: Students can draw a picture in each storyboard frame and write an explanatory sentence beneath it. Estimations of the time that each frame represents can be recorded in the space provided.

STEP 6: Have students make clean copies of their storyboards on the second activity page and post them around the room.

PICTURE THIS PRODUCT

name:

date:

1. _____

_____

_____

_____

_____

time: _____

2. _____

_____

_____

_____

_____

time: _____

3. _____

_____

_____

_____

_____

time: _____

4. _____

_____

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time: _____

5. _____

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time: _____

6. _____

_____

_____

_____

_____

time: _____

SOCIAL STUDIES CONNECTIONS

MATHNET™

STEP BY STEP ACTIVITY

Graphing Public Opinion

TUESDAY

Poor Mike Pliers isn't the only person who has his popularity measured regularly. Pollsters have been measuring the popularity of American Presidents ever since the 1940s. Beginning with President Franklin Roosevelt, the Gallup Poll has asked the same question to a sample of the American public every two weeks: "Do you approve or disapprove of the way (President's name) is handling the job of President?" Presidents usually begin with a high approval rating in their "honeymoon" period, which eventually takes a downward slide. However, this is not always the case. In this activity, students compare approval ratings of U.S. Presidents reelected to a second term of office and research how current events are linked to a President's popularity.

WHAT YOU NEED:

copies of the activity page, three different colored pencils for each student

WHAT TO DO:

STEP 1: Distribute one copy of the activity page, "In the Public Eye," to each student. Explain that the table provides data from the Gallup Poll on the approval rating for three different U.S. Presidents who were all reelected to a second term of office.

STEP 2: Have students use the data in the table to create one line graph showing the American public's opinion of each of these Presidents. Students should use a different colored pencil for each President—as shown in the answer key below—and fill in the legend with the appropriate colors.

STEP 3: When students have completed their graphs, ask them to compare the approval ratings for the three Presidents. How are they alike? How are they different?

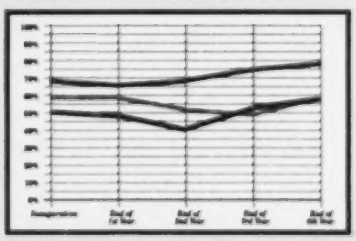
STEP 4: To learn more about the factors influencing public opinion, ask students to research events that took place in specific years of each of these President's first terms.

ANSWER KEY:

EISENHOWER

NIXON

REAGAN



The Case of the Deceptive Data

inside story

George is upset by the cancellation of his favorite show, "Mike Pliers." Mike lost in the ratings to the mindless "Vicious Vinnie Vermin Show." At the

Hoover TV Rating Service, executive Wellworth Watching shows how the ratings work. But the company's president, Mr. Hoover, passes on hot information—a computer break-in has made all their ratings data suspect. The Mathnetters find critical data changes: Mike Pliers' ratings fell at exactly the same time Vicious Vinnie's shot up. Kate and George visit some of the ratings sample households, and find that somebody tampered with the ratings boxes. But who? The villain turns out to be Wellworth Watching—a soured TV personality who vowed revenge on viewers, and posing as Vicious Vinnie, nearly got it. (See page 24 for show numbers featuring "The Case of the Deceptive Data.")

Understanding Citizenship

MONDAY

George Frankly isn't just hot under the collar, he's outraged. He tells Kate that he has a right to express his opinion. He reminds her that on important issues, "people have to stand up and be counted." Have students name some different ways people in a community and a nation can express their opinions. (For example: voting, running for office, working for a political candidate, attending a town or a city council meeting, writing a letter to the newspaper, or participating in a protest march.) Ask each student to pick a local issue of interest and write a letter to a local official expressing her or his viewpoint.

FOLLOW-UP

Two polls frequently found in the media are the Roper and Gallup polls. Students can write letters to these polling organizations asking for information about the types of surveys they conduct, the sampling error on their surveys, and the qualifications of people who work as pollsters. The addresses for these polls are: George Gallup, PO Box 628, Princeton, NJ 08540; and Roper Organization, 205 E. 42nd Street, 17th Floor, New York, NY 10017.

In the public eye

name:

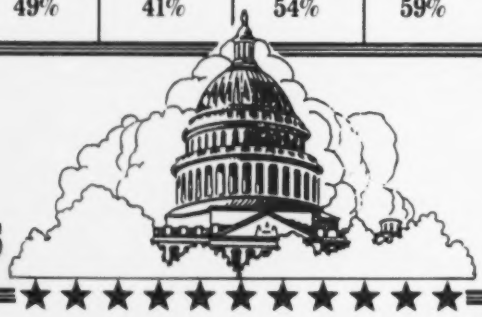
date:

Use information in chart A to plot line graph B showing each President's approval rating. Use a different colored pencil for each President.

A.

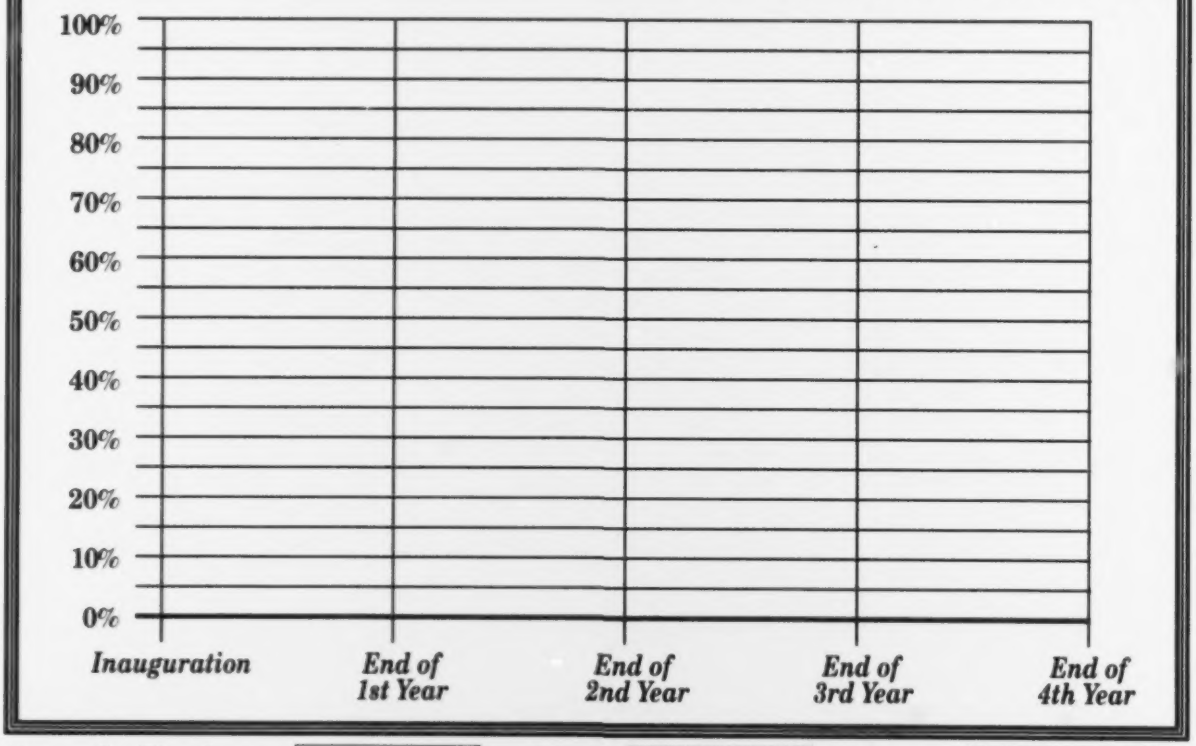
Approval Ratings

President	*Years of 1st Term*	*Inauguration*	*End of 1st Year*	*End of 2nd Year*	*End of 3rd Year*	*End of 4th Year*
Dwight D. Eisenhower	1953-1957	68%	66%	68%	75%	79%
Richard M. Nixon	1969-1973	59%	59%	52%	49%	59%
Ronald Reagan	1981-1985	51%	49%	41%	54%	59%



B.

Presidential Approval Ratings



Legend: Eisenhower ☐ Nixon ☐ Reagan ☐

The Case of the Deceptive Data...continued

Analyzing Demographics

WEDNESDAY

Jerry Lynn, President of the Mike Pliers Fan Club, wonders why anyone cares about how many people watch the 'Mike Pliers' show. Kate explains that advertisers want as many people as possible to watch their commercials. They also want viewers who are most likely to buy their products. Ask students to watch a cartoon program on Saturday morning and the national news in the evening, and to keep a list of the products that are advertised during each program. How are the products advertised on Saturday morning different from those advertised during the news? What do the commercials reveal about the television audience? Do all cartoon programs feature the same advertisements? Are some products specifically targeted for girls or for boys? Have students identify these products and the cartoon programs where these commercials appear. What might students assume about the audiences of these cartoons?

Analyzing Polls

THURSDAY

Wellworth Watching sent the ratings of the 'Mike Pliers' show into a nose dive by tampering with rating boxes on viewers television sets. Far more often, poor survey or sampling methods are the cause of false or misleading conclusions. Ask students to look through magazines and newspapers to find opinion polls. The polls can be analyzed using these questions.

1. **What is the size of the sample?** A claim that 75% of voters questioned want Ann Adams for School President may lead readers to the wrong conclusions if only four out of 80 possible voters made up the sample.
2. **Who answered the survey?** A poll of *Dancers Magazine* readers may result in different answers to questions about favorite activities than a poll of *Baseball Digest* readers.
3. **Who conducted the survey?** If a newspaper survey conducted by the Vicious Vinnie Fan Club shows Vinnie is the leading candidate for mayor, be suspicious.

F.Y.I.

A famous case involving poor sampling took place just before the 1936 presidential election. Literary Digest, a popular magazine, mailed over 20 million postcard ballots asking recipients to mark their choice for President. The 2.3 million ballots returned showed that Alf Landon, the Republican challenger to Democrat Franklin D. Roosevelt, would win a landside victory. Instead, Roosevelt won in a landside. What went wrong? Names of those polled were taken from telephone directories and automobile registration lists. In 1936, during the Great Depression, only the rich had telephones and cars. The opinions of the less wealthy and the jobless, who comprised a large part of the population, were not recorded. The sample did not accurately represent all voters.

STEP BY STEP ACTIVITY

Graphing Voting Habits

FRIDAY

The Mathnetters now know that Wellworth Watching was well worth watching, at least long enough to uncover his deceptive data. Understanding data and using it properly are often tricky. In this activity, students discover how different conclusions can arise from seemingly similar information.

WHAT YOU NEED:
copies of the activity page

WHAT TO DO:

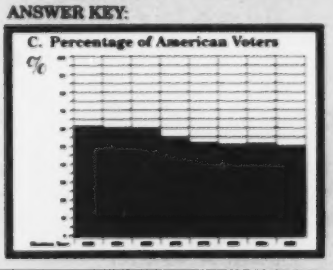
STEP 1: Distribute one copy of the activity page, "Graphs Are Well Worth Watching," to each student.

STEP 2: Explain that graph A shows the number of people who voted in each Presidential election between 1960 and 1988. What conclusions can students draw from this graph?

STEP 3: Chart B shows the percentage of people eligible to vote who actually voted in each presidential election year. What do students conclude from this data? Have students make bar graph C using this information.

STEP 4: Ask students to compare their bar graphs with the graph in box "A." How do the conclusions they draw from each graph differ? Has the percentage of Americans voting in presidential elections been rising or falling since 1960? How about the number of American voters?

ANSWER KEY:

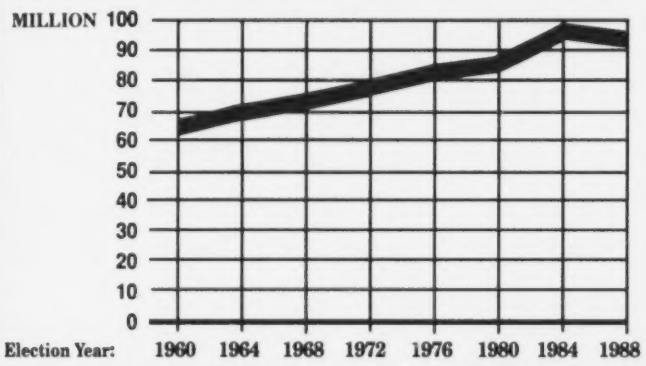


GRAPHS ARE WELL WORTH WATCHING

name:

date:

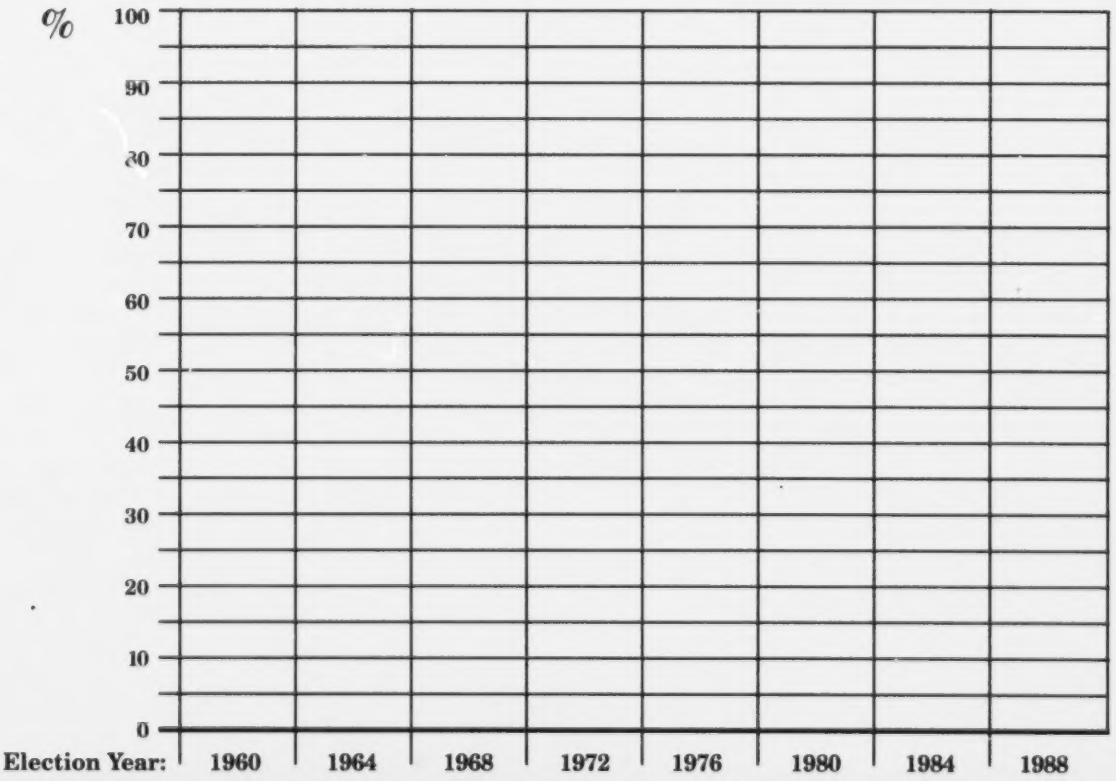
A. Number of actual voters in Presidential elections (in millions)



B. Percentage of eligible Americans who voted

Election Year	% of Americans
1960	62.8
1964	61.9
1968	60.9
1972	55.2
1976	53.5
1980	52.6
1984	53.1
1988	50.2

C. Percentage of American Voters



GAME SHOWS!

STEP BY STEP ACTIVITY

SQUARE ONE TV'S "Piece of the Pie" takes an inventive look at analyzing survey information and organizing it into a pie chart. In these three activities, students use their knowledge of United States geographic regions, cities, and current events to create a "Piece of the Pie." (For "Piece of the Pie" game rules and show numbers turn to page 24.)

Public Opinion Survey

Students can collect and analyze their own data by conducting a class-wide survey using these questions: **1. What is one quality you think is important in a President?** (Possible answers may include: good decision-maker, intelligent, honest, hard-working, experienced in government.) **2. What is the most serious problem our country has today?** (Possible answers may include: drugs, pollution, violence/crime, war, homeless people, education.) **3. What is one way citizens can help their country?** (Possible answers may include: obey laws, don't litter, recycle, vote, do volunteer work, pay taxes.) Have students determine the top five responses, discard the less popular choices, and create a pie chart showing the results. View an episode of "Piece of the Pie" and review the game rules. Have students write questions and answers for the show, based on the data they've collected, and play the game with another class.

Asking Questions Based on U.S. Regions

View an episode of "Piece of the Pie" with students, asking them to pay special attention to the questions asked of the contestants. Students can try writing questions for the show that would have different answers, depending upon which region of the United States was surveyed. For example, the question, "What winter sports do you participate in most often?" would receive different responses from those living in the Northeast than from those living in the Southeast. Encourage students to think very carefully about how they phrase their questions.

FOLLOW-UP

AMERICAN PIE

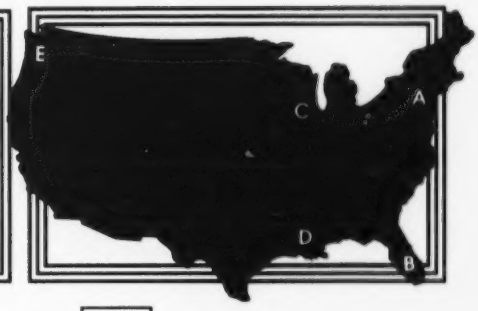
name:

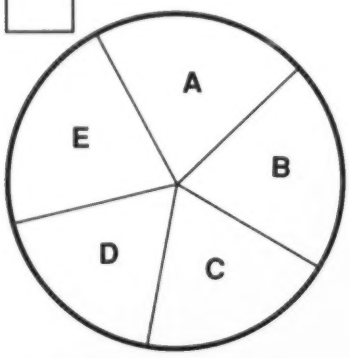
date:

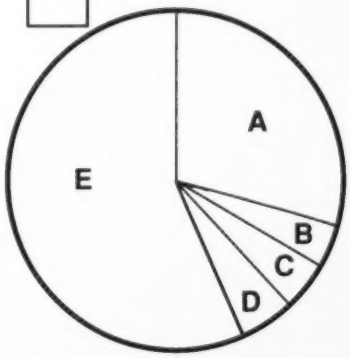
1. Name a city with tall buildings.
2. Name a city by water.
3. Name a city with a lot of rainfall.

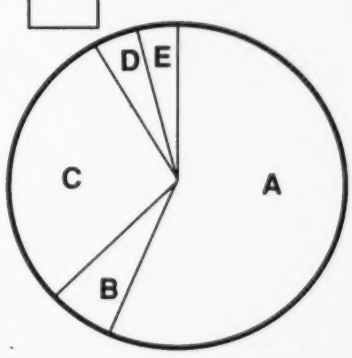
legend:

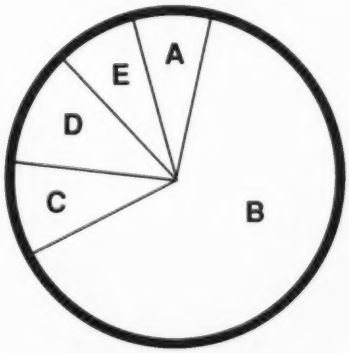
A = New York City, New York
B = Miami, Florida
C = Chicago, Illinois
D = New Orleans, Louisiana
E = Seattle, Washington











Statement:

Explanation:

SOCIAL STUDIES CONNECTIONS

Commercials

Public Service Announcements (PSA's) and political advertisements are two ways that citizens can learn about important social issues. In these activities, students write PSA's and political advertisements—SQUARE ONE style. (See page 24 for show numbers featuring SQUARE ONE TV commercials.)

PSA's about Unit Pricing

take one

Just as commercials try to inform consumers about products, PSA's are a good way to get information to the public about issues of social importance—community events, health hazards, non-profit organization activities, or consumer economics. Have students visit the supermarket with an adult to discover that detergents often come in different size containers and that the price per ounce often varies. Discuss the concept of unit pricing, and have students write a PSA that helps consumers to understand unit pricing and that cautions consumers to purchase wisely. The PSA should identify the sponsor and where a listener can write or call for more information.

PSA's about the Environment

take two

Divide students into small groups and have them discuss examples of waste and pollution. They should pay particular attention to examples in which many minor offenses accumulate into a very big problem. For example, how much paper might students in school waste in a year? How much gasoline might be wasted because communities don't provide public transportation? Once groups have selected an issue, ask them to write a PSA that gets across the message. The PSA should identify the problem and dramatize the relationship between individual acts and the solution to the problem.

FOLLOW-UP

Have teams do live skits or television commercials based on their storyboards. Use a large cardboard box to make a wide-screen television frame and have groups perform their commercials for the class with the audio portion performed by an announcer chosen by each team.

STEP BY STEP ACTIVITY

Political Commercials

In this activity, students will combine mathematics and politics to make their own political commercials.

WHAT YOU NEED:
copies of the activity page, markers

WHAT TO DO:

STEP 1: Discuss political advertising with the class. If possible, view some recorded examples and discuss techniques candidates use.

STEP 2: Tell students that they will make storyboards of their own political advertisements for competing candidates.

STEP 3: Divide students into production teams and have each team imagine a candidate with an issue like "the United States should use only the metric system," or "there is no point in having fractions, and decimals, and percents."

STEP 4: Distribute four copies of the activity page, "Vote for Me," to each production team. Teams should create two storyboards—one for their own candidate, and one for their candidate's opponent, who presents an alternative viewpoint on the issue.

STEP 5: Teams draw pictures in the storyboard frames, making sure that the video portion of the commercial makes the audio portion clear. The time that each frame represents should be recorded in the space provided.

STEP 6: Have teams trade activity pages and offer suggestions to each other about how the commercial might be improved. Teams then trade papers back and make clean copies of their storyboards, using helpful suggestions.

VOTE for ME!

name:

date:

1.

time:

2.

time:

3.

time:

4.

time:

5.

time:

6.

time:

MATH BONUS

Where can you find commercials that promote mathematics? Only on SQUARE ONE TV! These activities help students apply information shown in three SQUARE ONE TV commercials. (See page 24 for show numbers featuring specific SQUARE ONE TV commercials.)

Making a Bar Graph

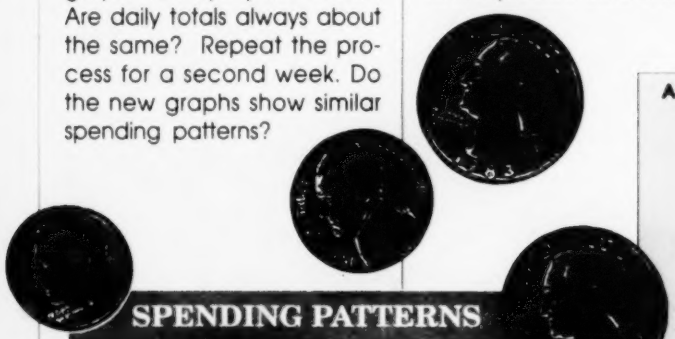
take one

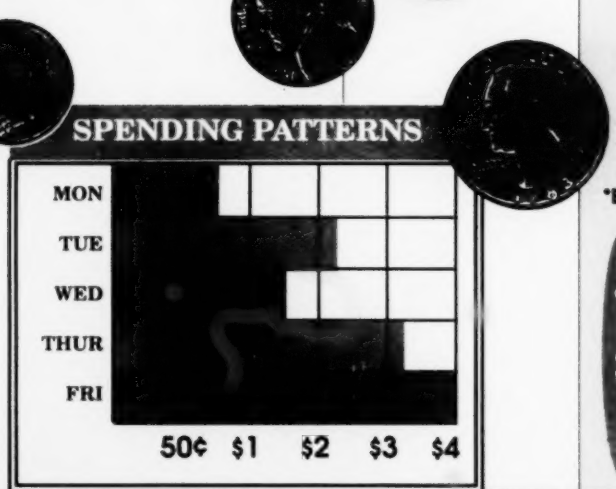
View "Data Headache: Bar Graph" with the class. Mrs. Tuttle has been trying to keep track of her monthly expenses but hasn't been able to get organized. Does your class have a similar problem? For one week, have each student keep track of his or her daily spending. Collect and total the data each morning. The following week, students can make bar graphs to display the results. Are daily totals always about the same? Repeat the process for a second week. Do the new graphs show similar spending patterns?

Making a Pie Chart

take two

View "Data Headache: Pie Chart" with the class. This weary cab driver has the same kind of problem as Mrs. Tuttle. The taxi business generates a lot of information, but offers no way to organize it. Enter the pie chart! With the percentage of his expenses safely displayed, this cab driver can go back to watching television. What kinds of expenses do your students have—lunch, toys, school supplies? Help the class organize their expenses into categories and represent the results in a pie chart.





STEP BY STEP ACTIVITY

Using a Map

Maps can be used as a source of mathematical questions. In this activity, students will measure, estimate, calculate, and get experience with scale drawings.

WHAT YOU NEED:
copies of the activity page, pencils, rulers, calculators

WHAT TO DO:

STEP 1: View "The Map" with students. Discuss the ways in which math is used.

STEP 2: Distribute one copy of the activity page, "Down to Scale," to each student. Be sure to point out the scale in the lower right-hand corner.

STEP 3: Ask students to find the shortest route between A and B on the map. About how many inches is it? Make sure students stay on the road. How many miles do these inches represent?

STEP 4: Have students complete the first column of the chart on the activity page.

STEP 5: Working individually or in small groups, have students complete the chart by finding the shortest distance between points.

ANSWER KEY*:

	A to B	B to C	A to C	C to D	B to D	A to D
inches on the map	3	3 1/2	7 1/4	4 3/4	7 1/2	3
miles on land	60	70	134	88	144	58
time at 30 mph	2 hrs. 15 mins.	2 hrs. 29 mins.	3 hrs. 29 mins.	2 hrs. 8 mins.	3 hrs. 23 mins.	1 hr. 23 mins.
time at 15 mph	4 hrs. 30 mins.	4 hrs. 57 mins.	9 hrs. 59 mins.	4 hrs. 17 mins.	6 hrs. 45 mins.	2 hrs. 42 mins.
time at 45 mph	1 hr. 30 mins.	1 hr. 39 mins.	2 hrs. 20 mins.	1 hr. 26 mins.	2 hrs. 15 mins.	54 mins.

*Estimates will vary within a few miles, minutes or fractions of an inch.

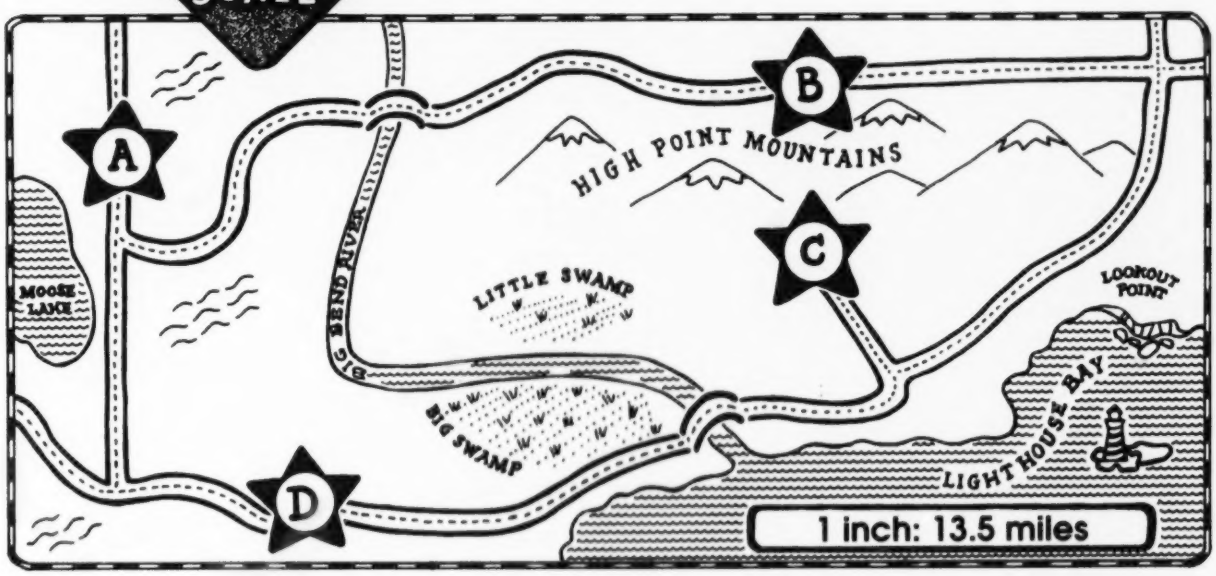
FOLLOW-UP

Make a poster by starting with a map of your city, town, community, or state. Highlight notable locations. How do people typically go from one of these locations to another? Do they walk, go by car, or take a plane? How fast do they go and what are typical travel times? Organize and display this information as part of the poster.

name:

date:

DOWN TO SCALE



NAVIGATOR'S GUIDE

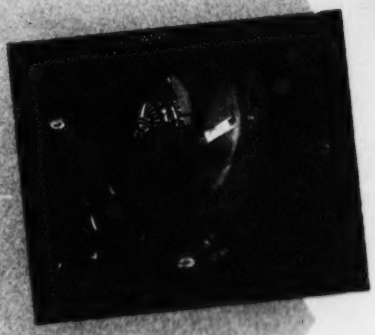
	A to B	B to C	A to C	C to D	B to D	A to D
inches on the map						
miles in real life						
time at 30 mph						
time at 15 mph						
time at 45 mph						

CURRICULUM

SQUARE ONE TV has three goals, which are outlined here in detail for easy reference.

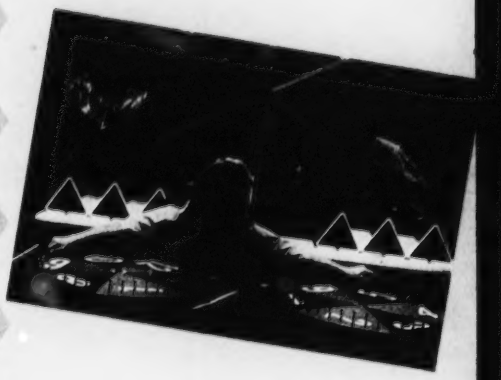
GOAL II. To encourage the use and application of problem-solving processes by modeling:

A. Problem Formulation
1. Recognize and state a problem.
2. Assess the value of solving a problem.
3. Assess the possibility of solving a problem.



B. Problem Treatment
1. Recall information.
2. Estimate or approximate.
3. Measure, gather data, or check resources.
4. Calculate or manipulate (mentally or physically).
5. Consider probabilities.
6. Use trial-and-error or guess-and-check.

C. Problem-Solving Heuristics
1. Represent problem: scale model, drawing, map; picture; diagram, gadget; table, chart, graph; use object, act out.
2. Transform problem: reword, clarify; simplify; find subgoals, subproblems, work backwards.
3. Look for: patterns; missing information; distinctions in kind of information (pertinent or extraneous).
4. Reapproach problem: change point of view, reevaluate assumptions; generate new hypotheses.



D. Problem Follow-up
1. Discuss reasonableness of results and precision of results.
2. Look for alternative solutions.
3. Look for alternative ways to solve.
4. Look for, or extend to, related problems.

GOAL III. To present sound mathematical content in an interesting, accessible, and meaningful manner by exploring:

A. Numbers and Counting
1. Whole numbers.
2. Numeration: role and meaning of digits in whole numbers (place value); Roman numerals; palindromes; other bases.
3. Rational numbers: interpretations of fractions as numbers, ratios, parts of a whole or of a set.
4. Decimal notation: role and meaning of digits in decimal numeration.
5. Percents: uses; link to decimals and fractions.
6. Negative numbers: uses, relation to subtraction.

GOALS

B. Arithmetic of Rational Numbers

1. Basic operations: addition, subtraction, division, multiplication, exponentiation; when and how to use operations.
2. Structure: primes, factors, and multiples.
3. Number theory: modular arithmetic (including parity); Diophantine equations; Fibonacci sequences; Pascal's triangle.
4. Approximation: rounding; bounds; approximate calculation; interpolation and extrapolation; estimation.
5. Ratios: use of ratios, rates, and proportions; relation to division; golden section.

C. Measurement

1. Units: systems (English, metric, nonstandard); importance of standard units.
2. Spatial: length, area, volume, perimeter, and surface area.
3. Approximate nature: exact versus approximate, i.e., counting, versus measuring; calculation with approximations; margin of error; propagation of error; estimation.
4. Additivity.

D. Numerical Functions and Relations

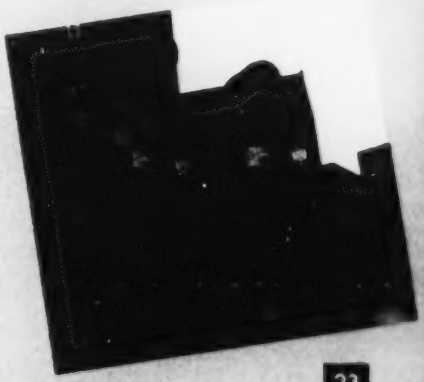
1. Relations: order, inequalities, subset relations, additivity, infinite sets.
2. Functions: linear, quadratic, exponential; rules, patterns.
3. Equations: solution techniques (e.g., manipulation, guess-and-test); missing addend and factor; relation to construction of numbers.
4. Formulas: interpretation and evaluation; algebra as generalized arithmetic.

E. Combinatorics and Counting Techniques

1. Multiplication principle and decomposition.
2. Pigeonhole principle.
3. Systematic enumeration of cases.

F. Probability and Statistics

1. Basic quantification: counting; representation by rational numbers.
2. Derived measures: average, median, range.
3. Concepts: independence, correlation; "Law of Averages."
4. Prediction: relation to probability.
5. Data processing: collection and analysis.
6. Data presentation: graphs, charts, tables; construction and interpretation.



G. Geometry

1. Dimensionality: one, two, three, and four dimensions.
2. Rigid transformations: transformation in two and three dimensions; rotations, reflections, and translations; symmetry.
3. Tessellations: covering the plane and bounded regions; kaleidoscopes; role of symmetry; other surfaces.
4. Maps and models in scale; application of ratios.
5. Perspective: rudiments of drawing in perspective; representation of three-dimensional objects in two dimensions.
6. Geometrical objects: recognitions; relations among constructions; patterns.
7. Topological mappings and properties: invariants.

TEACHER'S

REFERENCE SECTION

GAME SHOW RULES

These rules will help your class play the game shows, "Close Call" and "Piece of the Pie," just like contestants do on television! For more game show fun, try the SQUARE ONE TV *Game Shows Teacher's Guide*.

CLOSE CALL

Sometimes in real life things aren't as exact as you want them to be—that's when estimation takes over. In this game, the host presents student contestants with a visual estimation task like one of these: How many pieces are there in this jigsaw puzzle? How many peanut-butter jars tall is that elephant on stage?

There are three rounds. After being shown an estimation task and a referent, contestants get ten seconds to write down their estimates. Then they reveal their answers one by one. Whoever makes the closest estimate in each of the first two rounds qualifies for the final championship round.

Once your class understands how the game works, try playing it for points—the better the estimate, the higher the score. The class audience can participate by voting on how close the contestants' championship estimations come to the real answer.

The above rules are used in shows numbered in the 200's. For a variation on these rules, view a game of "Close Call" in a show numbered in the 300's.

PIECE OF THE PIE

Name your favorite snack. Is it pizza? Popcorn? Raw cauliflower? Think hard before answering, because in this game, only the most popular answers count.

Here's how to play. There are two teams, each with three contestants. At the beginning of the game, the host reads a survey question, such as, "Name something you see at a parade." Then, alternating teams, he asks each contestant to guess the most popular choices made by elementary school students in an actual survey. Each team is allowed a "huddle," to discuss their answer.

When one of the five top choices* is guessed, the appropriate percentage is displayed on a pie chart. The team that accumulates over fifty percent of the pie wins.

The above rules are used in shows numbered in the 200's. For a twist on these rules, view an episode of "Piece of the Pie" in a show numbered in the 300's.

**Note that the less popular choices made in the survey are actually discarded. The top five serve as the base from which the percentages used in the game are calculated.*

SQUARE ONE TV REFERENCE LIST

Be sure to tape SQUARE ONE TV off the air so you'll have the segments you need. To help you locate specific segments of interest, we've listed the show numbers each segment appears in below. Show numbers are shown at the beginning of each program.

MATHNET
The Trial of George Frankly Shows: 116–120, 151–155, 171–175
The Case of the Deceptive Data Shows: 211–215

GAME SHOWS
Close Call Shows: 202, 208, 214, 217, 222, 229, 233, 237, 303, 311, 323, 327, 334
Piece of the Pie Shows: 203, 209, 215, 219, 224, 226, 231, 239, 310, 314, 325, 330, 336, 338

CELEBRITY SIGHTINGS
Debbie Allen Shows: 116, 207, 208
Harry Blackstone Shows: 108, 109, 111, 114, 116, 119, 122, 125, 126, 128, 132, 135, 137, 140, 142, 145, 148, 152, 154, 156, 160, 165, 167, 172, 202, 206, 207, 210, 214, 216, 219, 222, 226, 228, 232, 236, 240, 318, 319, 320, 339
Tamara Bickers Shows: 116, 208, 220
Carole Blew Shows: 132, 134
The Fat Boys Shows: 201, 226, 309, 337
Marion Glover Shows: 208, 216, 240
Ali Hadi-Shaikh Shows: 128
Shari Lewis & Lamb Chop Shows: 107, 130
The Jets! Shows: 209, 227, 302, 320, 336
Frederick Koehler Shows: 116, 174
Eddie Lawrence Shows: 202, 203, 220, 226, 232, 236
Roger Ray Lombard Shows: 120, 124
Kenneth Mars Shows: 131–135, 138–170
Mathnet Mathnet is featured at the end of every show.
Episodes featuring James Earl Jones include shows: 111, 112, 114, 115, 118, 119, 120, 149, 147, 149, 151, 153, 154, 156, 171, 173, 174, 175
Kevin McCarthy Shows: 121–126, 166–169
Bobby McFerrin Shows: 201, 219, 235
Doug Miller Shows: 202, 210, 230, 237
John Mumblin Shows: 102, 174, 326
Regina Shows: 203, 220
Kelsey Shows: 202–237
Jack Riley Shows: 211–216
Dick Sargent Shows: 211–216
Rosalyn Sussell Shows: 107–110, 320–340
Allison Smith Shows: 147, 156, 159, 207, 324
Melanie Stevenson Shows: 211–216
Dennis Weaver Shows: 202, 203, 226, 237
Dick Wilson Shows: 101–105, 136–140
William Windom Shows: 116–120, 151–155, 171–175
Deborah Zoglin Shows: 10, 202
Mona Dash Zepeda Shows: 102, 106

Bring the excitement of programs from Children's Television Workshop into your classroom with the help of these materials!

SQUARE ONE TV

NEW! CURRICULUM CONNECTIONS TEACHER'S GUIDE provides activities for linking SQUARE ONE TV's game shows, commercials, and Mathnet to your social studies and language arts classes @ $3.00.

The original SQUARE ONE TV TEACHER'S GUIDE offers an overview of the series, with suggestions for classroom use of segments ranging from Mathman to Backstage with Blackstone @ $2.00.

MATHNET TEACHER'S GUIDE provides activities linked to the weekly mysteries of Mathnet, the detective serial that wraps up every SQUARE ONE TV program @ $3.95.

GAME SHOWS TEACHER'S GUIDE offers complete rules and strategies for SQUARE ONE TV game shows, as well as activities to help students explore the mathematical concepts behind the games @ $3.25.

3-2-1 CONTACT

3-2-1 CONTACT TEACHER'S GUIDE provides activities for Seasons IV to VII, ranging from hands-on activities to board games @ $4.25.

3-2-1 CONTACT DATA BASE is a software package, available on IBM-PC and Apple II formats, that features a comprehensive subject index and textbook correlations to this award winning series @ $6.95.

To order these items, use the card enclosed in this teacher's guide. Discounts are available for bulk orders of more than 50 copies.

Don't forget to tape SQUARE ONE TV and 3-2-1 Contact off the air to use in your classroom. It's free, and it's perfectly legal as long as you erase the tapes within three years.

CHILDREN'S
TELEVISION
WORKSHOP

END

U.S. Dept. of Education

Office of Educational
Research and Improvement (OERI)

ERIC

Date Filmed
July 18, 1991